THE IP TRANSITION AND THE NEED FOR COMMON CARRIER REGULATION

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I. INTRODUCTION

Federal communications regulators continuously have a daunting task. Each day, technology races ahead as companies develop new products intended to wow consumers and render old regulations and their protected entities obsolete. Driven by advances in networking and computing power, the Internet has enabled a variety of previously unheard-of combinations of technologies to coexist on a single network.[1] Consumers expect to view information and entertainment on any device, at any time. In the past, technologies like cable television existed on separate networks from computer data, which was itself separate from telephone service.[2] Today, a single broadband connection can deliver all of these services, from any provider worldwide.[3] This has not only widened consumer options, but has vastly improved the operations of businesses around the globe.[4]

* Thanks to Patrick Welsh and Christopher Wieczorek for their invaluable input on this Note. Thanks also go to my wife Amy for her unwavering support during my time at CUA law.

1 Tracy V. Wilson & John Fuller, *How Home Networking Works?*, HOWSTUFFWORKS, http://bit.ly/1GPRDts (last visited Sept. 08, 2014).

2 Timothy B. Lee, *Keeping the Internet Competitive,* 11 NAT'L. AFF. 59-60, 68, (2012), *available at* http://bit.ly/13xUWJN .

3 *See, e.g., Netflix Investor Relations*, NETFLIX, http://nflx.it/1uR5sSC (last visited Sept. 08, 2014) ("Netflix members can watch as much as they want, anytime, anywhere, on nearly any Internet-connected Screen."); *How Vonage Works*, VONAGE, http://bit.ly/1oiydbc (last visited Sept. 08, 2014) ("Vonage home phone service connects your calls using your high-speed Internet Connection, not a traditional phone line […]"); Timothy B. Lee, *Keeping the Internet Competitive,* 11 NAT'L. AFF. 59, 69 (2012), *available at* http://bit.ly/13xUWJN. ("Most house-holds today have two options for wired voice, video, and data services: their local telephone incumbent and their local cable incumbent.").

4 *See e.g.,* COMM. ON ENERGY & COMMERCE, MEMORANDUM REGARDING HEARING ON "THE EVOLUTION OF WIRED COMMUNICATIONS NETWORKS"(Oct. 21, 2013) *available at* http://1.usa.gov/1sEWnkE ("A generation raised on the Internet and the power and flexibility of Internet Protocol expect our nation's laws to reflect the technological progress and innovation that has been the economic engine of the United States for decades."); Rob Bamforth & Clive Longbottom, *Quocirca: Optimizing the online customer experience in Telecommunication*, ORACLE, http://1.usa.gov/1sEWnkE (last visited Sept. 09, 2014) ("As networks, devices and media converge, telecommunications companies (telcos) have increas-

Despite the unity and convergence brought by Internet Protocol (IP) networks, the physical architecture over which data is transmitted is anything but unified.[5] The disparate structures of physical networks are evident not only in network design, but also in legal treatment by regulators.[6] Part I of this Comment examines these basic technological and legal differences separating the networks available to most American consumers and businesses, and outlines reasons why the industry is moving towards a unified, all-IP network. Part II considers the ongoing Federal Communications Commission ("FCC" or "Commission") proceeding designed to evaluate and implement the transition to an all-IP network. In Part III, this Comment recognizes legal uncertainties surrounding the FCC special access rulemaking and the subsequent suspension of AT&T's proposed tariffs. Finally, Part IV proposes a common carrier framework that is designed to simplify and improve upon the current regulations. The proposed framework addresses current market problems by treating providers equally, treating technologies equally, and meaningfully measuring market power so that competition is allowed to operate in both urban and rural areas.

II. BACKGROUND – A TECHNOLOGY PRIMER

Before considering the policy implications that flow from the shift to IP networks, some technological background is necessary. All communications networks are configured to operate in one of two ways: Time Division Multiplexed (TDM) or Internet Protocol (IP). Older networks use TDM technologies, which divides a line into a finite number channels for each transmission.[7] As an example of TDM technology, a T1 line can carry up to twenty-four channels, each of which could be used for a separate telephone call.[8] When a call is made or data accessed over a TDM network, individual channels are

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ingly complex catalogues of products and services to offer customers who are constantly being inviting to switch to other providers.").

5 *See Analog Phone System vs. Digital Phone System*, SHORETELSKY, http://bit.ly/1sEWCfM (last visited Sept. 09, 2014) (explaining there are two types of telephone systems with features and capabilities).

6 *See* COMM. ON ENERGY & COMMERCE, *supra* note 4 (the Communications Act of 1934, The Telecommunications Act of 1996, and the U.S. Department of Justice's antitrust case against AT&T are all examples of legal actions that were created to make a modification in regards to communication advances).

7 *See* Tim Greene, *VoIP vs. TDM Voice*, NETWORK WORLD (Oct. 26, 2007, 1:00AM), http://bit.ly/1z3O6sf ("TDM isn't dead yet as the backbone of corporate phone networks, but it is definitely in its last thores.").

8 *See How Does a T1 Line Work?*, HOWSTUFFWORKS, http://bit.ly/16t9341 (last visited Sept. 09, 2014) (explaining how T1 line works).

reserved for that purpose alone.[9] This contrasts with newer networks that use IP, which breaks all data into information packets[10] that are sent along the same line.[11] In an IP network, users can operate any technology they choose so long as there is sufficient bandwidth to send and receive the necessary number of packets.[12]

TDM and IP based networks each have their own advantages and disadvantages. TDM networks rely on specialized network switching equipment that must be tailored to each use, and do not require computationally expensive equipment for each consumer.[13] One example of this is the private branch exchanges (PBXs) used by many businesses.[14] These are configured for voice traffic and provide seamless dialing and extensions for entire offices, while still allowing individual employees to rely on simple commodity analog telephones.[15] In contrast, IP networks allow significantly greater flexibility in use, but users must use devices that provide the necessary computing power to convert the service into packet form. In the IP version of the old analog PBX, office users must use IP telephones, which are more expensive and complex than traditional telephones.[16] However, a digital PBX with digital office phones can be used on the same data network that powers an entire office's computers and servers, without a separate voice network.[17] Digital PBX systems also permit

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9 *See* COMM. ON ENERGY & COMMERCE, *supra* note 4 ("[T]he infamous "all circuits are busy" message.").

10 *See* Gorry Fairhurst, *IPv4 Packet Header*, U. OF ABERDEEN: SCH. OF ENGINEERING (Nov. 18, 2008), http://bit.ly/16t9341 (explaining how IPv4 Packet Header works).

11 *See IP On Everything*, PCMAG, http://bit.ly/1wFvnB2 (last visited Sept. 13, 2014) (explaining how the IP network works).

12 *See* UBM TECHWEB, FIVE REASONS TO MOVE FROM A TRADITIONAL TDM NETWORK TO METRO ETHERNET 2,3 (Oct. 2012) *available at* http://bit.ly/13xXzLC [hereinafter UBM WHITE PAPER] (It is important to note that both TDM and IP networks can transmit their data in "digital" form. The only difference is how that data is packaged within the line, and therefore which equipment needed by the user and the service provider. A TDM network is purpose built; the equipment often can only perform a single function, such as process telephone calls. An IP network is flexible, using software and general-purpose processors to route data of any kind, including voice, video, text, and other communications).

13 *See Analog Phone System vs. Digital Phone System*, SHORETELSKY, http://bit.ly/1xriJau (last visited Sept. 13, 2014) (customers of TDM equipment can typically use ordinary analog telephones).

14 *See id.* (these are key for businesses because they enable employees to call each other without placing calls over a telephone company's network. PBXs also enable a business to have a single number with extensions for each employee).

15 *See id.* (explaining what are the PBXs capabilities and functions and how they can work in an office).

16 *See id.* (noting that in the short term, the cost of upgrading to IP often make it more expensive, but that over long term, it saves money on moving and maintenance).

17 *IP Phone Systems Overview*, DAKOTAPRO, http://bit.ly/1qZOWUe (last visited Sept. 13, 2014) (noting that IP phones can be run over the same cabling as an office's computer

seamless integration with mobile phones and allow rapid reconfiguration of services.[18]

It is important to bear in mind the technological distinction between TDM and IP services reaches all mediums of communication, not just wired services.[19] In cellular networks, for example, TDM networks for voice communications still exist as part of second generation (2G) standards such as Global Standard for Mobile (GSM) and third generation (3G) standards such as Universal Mobile Telecommunications System (UMTS).[20] These services each employ digital encoding for all voice calls, and some of these networks can even transmit data.[21] Only advanced fourth generation networks (4G) such as Long Term Evolution (LTE) are going to fully support IP communications, eventually routing all voice, text messages, and user data over IP.[22]

In addition to the manner of transmitting data, wired networks can be divided physically into two categories: those based on copper wires and those based on fiber optics. Copper wires are the oldest and simplest technology, and rely they on electrical signals to carry information.[23] Copper networks are also easy to assemble and install, and their widespread historical deployment provides amortized network infrastructure for many organizations.[24] Copper networks

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network, eliminating costly and duplicative networks).

18 *Id.* (IP services also enable forwarding to mobile telephone numbers, which enables connectivity in any location under a single telephone number).

19 *See*, *e.g.*, *One All-IP Transport For GSM and WCDMA Networks*, NOKIA SOLUTIONS AND NETWORKS, http://bit.ly/1uZ5kR3 (last accessed Aug. 23, 2014) (noting the differences effectiveness of IP services over TDM services); Mikael Ricknas, *Voice-Over-LTE Won't Take Off Until 2015, Will Have to Compete With Telephony Apps*, COMPUTERWORLD (July 5, 2013, 10:49AM), http://bit.ly/1xriMmO (noting how IP services and TDM services effect voice over LTE).

20 *See One All-IP Transport For GSM and WCDMA Networks, supra* note 19 (noting that GSM and WCDMA networks still rely on TDM networks because they natively transmit using TDM protocols).

21 *See* John Scourias, *Overview of the Global System for Mobile Communications*, PRIVATELINE.COM: GSM (PCS IN AM.), http://bit.ly/1yYnXGk (last visited Apr. 13, 2014) (explaining traffic channels).

22 *See Voice over LTE (VoLTE)*, NOKIA SOLUTIONS AND NETWORKS, http://nsn.com/portfolio/solutions/voice-over-lte (last accessed Apr. 13, 2014) (noting that LTE networks do not include any 2G or 3G network components, and route all traffic as IP data); *see also* Ricknas, *supra* note 19; Paul Kapustka, *Voice Over LTE Explained: Better Voice Quality Coming Soon to Your 4G Phone*, TECHHIVE (July 18, 2012), http://bit.ly/1vZ9Cr3 ("Voice over LTE, is "a standards-based technology that is required to support voice calls over an LTE network […]").

23 *See How Phones Work*, TELECOMM VIRTUAL MUSEUM, http://bit.ly/1wZ5sGD (last visited Sept. 11, 2014) (explaining how copper wires function).

24 *See In re* AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, *Comments of Telepacific Communications*, GN Docket 12-353, 2 (Jan. 28, 2013) (available via FCC Electronic Filing System) (noting that Telepacific still maintains some copper infrastructure and is able to provision services where fiber is not available).

do suffer from drawbacks, including low bandwidths, signal degradation over lengths as short as a few kilometers, vulnerability to electrical storms and corrosion, and high raw materials costs.[25]

In contrast, fiber optics transmit information using pulses of laser light which are channeled through glass strands.[26] The nature of the materials used means that signals can be transmitted over tens or even hundreds of kilometers without significant degradation and that the highest bandwidths are possible.[27] The glass strands are non-conductive, rendering fiber cables resistant to lightning and corrosion.[28] The fiber optic cables also tend to have lower materials cost than copper cables,[29] and lower latencies[30] are achieved through the elimination of repeaters and transceivers on long runs.[31]

There are also hybrid networks that employ both optical fibers and metallic conductors for different sections of the network.[32] The most commercially successful example of this is Data Over Cable Service Interface Specification (DOCSIS), which is used to deliver IP services over a combination of copper coaxial cables and fiber optics.[33] In hybrid networks like DOCSIS, high performance fiber optics are used to deliver massive amounts of data to nodes

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25 bboxadmin, *8 Advantages to Choosing Fiber Over Copper Cable*, INSIDE THE BOX (Dec. 8, 2011), http://bit.ly/13ayHbM.

26 *See* Greg Sanger, *How Fiber Optics Works,* THE INDUS. PHYSICIST Feb./Mar. 2002, at 18-19, *available at* http://bit.ly/1BYeUIR (explaining how Fiber Optics works).

27 *See* bboxadmin, *supra* note 25.

28 *See id.* (noting that fiber optic cables can even be submerged in water) (explaining the reliability and protection fiber optics provides when exposed to natural elements).

29 This lowered materials cost not only reduces installation costs but makes installed wiring less susceptible to theft and scavenging. *See* Mark Koba, *Copper Theft "Like an Epidemic" Sweeping US*, CNBC (July 30, 2013), http://cnb.cx/13bN2V6 (noting the costs of copper cables).

30 Latency is the time delay between a stimulation and a response, and is commonly referred to as "lag time" or simply "network delay." While immaterial for some applications (television, data transfer), it is critical in applications where two people or devices are communicating simultaneously (telephone and video conferencing, for example). *See Understanding Latency*, APPLE, INC., http://bit.ly/1sF3yJM (last visited Apr. 13, 2014) (explaining what is a latency); *see also Network Concerns for Video Conferencing,* U. OF GA. ENTERPRISE INFO. TECH. SERVICES, http://bit.ly/13bNmDg (last visited Sept. 11, 2014) (explaining how a latency is used in conjunction with video conferencing devices).

31 *See Understanding Latency*, *supra* note 30 (noting that while individual repeaters do not add significant amounts of latency, large numbers of repeaters on longer cable runs can add noticeable latency).

32 Claire Swedberg, *Copper vs. Fiber,* ELECTRICAL CONTRACTOR MAG. (Apr. 2013), http://bit.ly/1uZ7lNm.

33 *See* Jim Barthold, *DOCSIS 3.0: About more than bandwidth – Not!*, CED MAG. (July 30, 2008), http://bit.ly/1wZ6ouF (the "HFC" referred to in the article is Hybrid Fiber over Coax, it employs fiber optics to deliver data over long distances from a central office to neighborhood nodes, and then traditional copper coaxial cables to connect the neighborhood nodes to individual customers).

which serve entire neighborhoods, but individual copper coaxial cables branch through the short neighborhood distances to serve individual customers.[34] These networks combine the speed of fiber optics with the economy of previously-deployed copper infrastructure.[35]

On top of wired networks, there are also wireless networks that deliver communications services to customers.[36] These networks use a variety of technologies, including simple unlicensed WiFi,[37] cellular networks,[38] microwave,[39] and satellite connections.[40] While wireless networks offer affordable last mile connectivity to homes and businesses, they still rely on installed fiber optic cables[41] to link to larger networks, much like hybrid wired networks rely on fiber optics to serve neighborhood nodes.[42] Additionally, while many wireless networks do not offer the bandwidth of fiber or even hybrid networks, the newest wireless networks have eclipsed older copper TDM solutions.[43]

In light of all of these factors, the technological advantages of wired networks that use fiber optic cables and transmit data over IP are becoming ever more apparent.[44] Even so, a purely technical approach does not completely explain the current state of the market for wired telecommunications access. For

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34 *See* Margaret Rouse, *Hybrid Fiber Coaxial Network (HFC Network)*, TECH TARGET, http://bit.ly/1z4qZOi (last visited Oct. 5, 2014) (explaining how hybrid fiber coaxial functions).

35 *See Id.* (noting the ways having a hybrid system is beneficial).

36 Swedberg, *supra* note 32 ("Wireless, in fact, is moving in and taking over. A lot of networks look similar to those of the past, but the number of people wired into the network is shrinking […]").

37 *See Wide Area Wireless Communication*, EDUCATION PORTAL, http://bit.ly/16tbdk4 (last visited Sept. 11, 2014) ("A wireless communication network refers to any type of network that establish connections without cables.").

38 *See id.* ("A mobile phone or cell phone is very much like a two-way radio; you can wirelessly send and receive information.").

39 *See id.* ("Microwaves are often used for point-to-point telecommunications, which means that the signal is focused into a narrow beam.").

40 *See id.* "Microwave signals are used for both satellite and ground-based communications. Many TV and telephone communications in the world are transmitted over long distances using microwave signals. They use a collection of ground stations and communication satellites." *Id.*

41 These fiber optic cables are known as "backhaul" in the industry. *See Tower Backhaul*, ZAYO GROUP, http://bit.ly/1DNj76I (last visited Oct. 5, 2011) (noting the reasons for a "backhaul").

42 *Module 2: Making ICT More Accessible and Affordable in Rural Areas*, ICT IN AGRIC., http://bit.ly/1wZ75Eq (last visited Sept. 11, 2014).

43 *See* John Brandon, *Broadband Grudge Match: Cable vs. DSL vs. 4G*, DIGITAL TRENDS (Sept. 22, 2011), http://bit.ly/1GsG6lD (noting that wireless 4G LTE is faster than copper DSL, though not quite as fast as cable modem service).

44 *See Comparison of Optical Fiber To Copper Wire*, LASER MOTIVE, INC., http://bit.ly/16tbOCw (last visited Aug. 25, 2014) (noting the advantages of wired networks that use fiber optic cables).

that, some historical perspective is necessary.

A. The Physical Plant of TDM Networks is Obsolete and Difficult to Maintain

Dating back to the original AT&T monopoly, TDM networks have formed the bulk of the American communications network for most of the 20th century.[45] These networks were originally designed for analog voice traffic[46] and, in their purest form, consisted of a copper loop that opened a continuous circuit between any two customers making a voice call.[47] This network design was simple and reliable in both concept and operation, but it required the profit margins of a government-sanctioned monopoly to build and maintain.[48]

Three major technology shifts ended the AT&T monopoly and the twisted pair networks it built. First, competition in the market for long-distance telephone service gutted AT&T's most important revenue stream, thanks to new microwave technology.[49] Second, cellular telephones meant that Americans could access convenient and affordable phone service wherever they were.[50] And third, the Internet emerged as a viable competitor to traditional communications services.[51]

Even with competitors, the TDM networks constructed by the old AT&T

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45 *See* Kevin Taglang, *Did we Crash your Phone Today?*, BENTON FOUND. (Oct. 25, 2013, 12:49 PM), http://bit.ly/13bOM0w (explaining the history of AT&T).

46 *See* María Isabel Gandía Carriedo, *ATM: Origins and State of the Art,* CESCA (Sept. 16, 2009), http://bit.ly/1AbQThY (explaining the history of ATM & TDM).

47 *See A Brief Refresher in Traditional Analog and Digital Voice Telephony*, JASON PALMER, http://bit.ly/1wL5SgJ (last visited Sept. 11, 2014) (explaining how analog was developed and used before the change in technology).

48 *See* BENJAMIN ET AL., TELECOMMUNICATIONS LAW AND POLICY 364-65 (3rd ed. 2012) (noting the problem of "gold plating" as AT&T's monopoly regulated under rate-of-return regulation); *See also* Taglang, *supra* note 45.

49 *See* BENJAMIN ET AL., *supra* note 48, at 346-47 (stating that microwave-based competitors first set up "private line service" for large corporations to connect distant branches without long-distance service, then used the technology to offer consumer services); *see also* EV ERLICH, PROGRESSIVE POLICY INST., POLICY MEMO: A BRIEF HISTORY OF INTERNET REGULATION 3 (2014) (Microwave links were cheaper to deploy than the long communications cables used by the incumbent long-distance provider, AT&T. Thus, new competitors were able to offer lower prices and win over customers in a field that was previously off limits due to the large capital requirements of running lengthy telephone cables).

50 *See Cutting the Cord*, THE ECONOMIST (Aug. 13, 2009), http://econ.st/1GsGC2W (noting that while this business trend came after the antitrust breakup of AT&T, it has resulted in lowered revenues for those incumbent local exchange carriers who do not also own a mobile phone business).

51 *See* Gayle Kesten, *VoIP Uptake Continues to Grow Among Smaller Businesses, Albeit Slowly*, NETWORK COMPUTING (Sept. 18, 2008), http://ubm.io/1AFYweD (VoIP networks have seen growth in businesses, and these depend on IP-based backbone networks).

monopoly live on.[52] Consumers are most familiar with traditional telephone lines that are used for both analog voice and IP-based Digital Subscriber Line (DSL) services, which employ copper twisted pair networks. Many small businesses and institutions of all kinds still rely on "T-carrier" systems such as DS1,[53] OC1,[54] and OC3[55] lines,[56] where a line is leased exclusively by a single customer and is provided with dedicated access to a network in a telephone company's central office.[57] In these TDM networks, copper or fiber cabling runs from a telephone company's central office to a customer, and the line is divided into "channels."[58] These channels can be used for any purpose, from routing telephone calls to sending data.[59]

While still valuable, these networks are quickly being eclipsed by the capabilities of fully IP fiber and hybrid fiber networks.[60] ADSL,[61] SDSL,[62] DS1,[63] and DS3[64] networks have all been eclipsed in bandwidth by modern DOCSIS 3.0[65] hybrid fiber coaxial networks and pure fiber optic networks.[66] Additional-

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52 Joan Engerbertson, *AT&T's TDM-to-IP Transition Trial Proposes LTE, U-verse Voice Service Replacements*, TELECOMPETITOR (Feb. 28, 2014, 1:00 PM), http://bit.ly/1yYqhNv (noting that AT&T's TDM networks are still being used).

53 DS1 stands for Digital Signal 1.

54 OC1 stands for Optical Carrier 1, and is the base speed of the Synchronous Optical Networking (SONET) fiber optic standard.

55 OC3 stands for Optical Carrier 3.

56 *See* Aaron Balchunas, *T-Carrier Technologies*, ROUTER ALLEY (Apr. 24, 2007), http://bit.ly/1BYoNJl (Note that traditionally, these lines used copper plant, but most large trunk lines have now been converted to OC1 and OC3 fiber.); *See Broadband, T1 or Ethernet: Which is Best for my Business?*, EXPERT TECH. ASSOC. (Aug. 2011), http://bit.ly/1zsCr5o (noting how a T1 line is beneficial for a business).

57 *See What Is an Analog Telephone Line?,* METROLINEDIRECT.COM, http://bit.ly/1sF74DS (last visited Sept. 11, 2014) ("[B]ut using the traking concept you can reduce the mount of telephone lines you pay for while servicing every phone in your business.").

58 *Broadband, T1 or Ethernet: Which is Best for my Business?*, *supra* note 56 ("A T1 circuit is a dedicated point-to-point line from your business' network to the telephone company's central office and then to the ISP.")

59 See *Tech Brief - T-1 and T-3 Circuits Provide LAN to WAN Interconnection*, QUABBIN, http://bit.ly/13bQnn6 (last visited Aug. 24, 2014) ("Simply put, TDM equipment processes multiple voice or data channels by first converting them from analog to digital…").

60 *See* PHIL WILSON, *IP or Bust: Migrating from TDM to IP*, DELOITE 5-6, *available at* http://bit.ly/1GsH80S (last visited Aug. 24, 2014) ("IP is already the dominant architecture for data services.").

61 ADSL stands for Asynchronous Digital Subscriber Line.

62 SDSL Stands for Synchronous Digital Subscriber Line.

63 DS1 stands for Digital Signal 1.

64 DS3 stands for Digital Signal 3.

65 DOCSIS 3.0 stands for Data Over Cable Service Interface Specification, version 3.0.

66 *See* Barthold, *supra* note 33 (noting that both hybrid DOCSIS 3.0 networks and Verizon's fiber FiOS have far more bandwidth available than DSL networks).

ly, the legacy[67] status of TDM networks has led to an exodus of equipment makers and technicians, making service and maintenance difficult.[68] Indeed, fiber networks are usually less costly than copper networks to maintain once installed, as fiber networks require fewer repeaters[69] over a given cable length and are more resistant to moisture incursion.[70] Even fiber TDM networks, such as OC1 and OC3 lines, have limitations compared to IP networks running over the same fiber optic cables.[71] This is because IP networks are more affordable to maintain and reconfigure than legacy TDM networks, because equipment is more readily available and can be redefined in software, without the need to dispatch technicians to manually reconfigure equipment.[72] Beyond the higher costs of provisioning and maintaining TDM networks, there are also other factors driving move away from TDM networks.

B. Consumers Demand IP-Based Services

The newest and most prominent consumer products and applications are now IP-based.[73] Because of the many advantages of IP data and fiber optic

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67 Kevin Werbach, *No Dialtone: The End of the Public Switched Telephone Network*, 66 FED. COMM. L.J. 203, 221 (2014), *available at* http://bit.ly/1qZShTe ("Legacy" is a broad term typically used to describe outdated, obsolete technologies. In the context of networks, TDM-based networks are often considered legacy networks versus IP networks).

68 Jon Brodkin, *'The Telephone Network is Obsolete': Get Ready For the All-IP Telco*, ARS TECHNICA (Jan. 7, 2013, 11:00 PM), http://bit.ly/1GsHhkT (quoting Hank Hultquist, AT&T VP of Federal Regulatory Division, who explains that equipment, spare parts, and technicians are in short supply for TDM networks).

69 *Introduction to Fiber Optics,* JM FIBER OPTICS, INC., http://bit.ly/1J2O6vM (last visited Aug. 26, 2014) (repeaters are devices that receive a weak signal and then retransmits that signal at a higher power so that the signal can cover longer distances. In copper wire transmission, repeaters are used at regular intervals to boost fading signals so that data rates are preserved over long distances. While repeaters are useful, they add complexity and power consumption to networks that rely on them).

70 *See* Peter Cochrane & David J. T. Heatley, *Reliability Aspects of Optical Fibre Systems & Networks*, PETER COCHRANE (Aug. 23, 2014), http://bit.ly/1wFzIEn (noting that fiber cables are not affected by moisture and that repeaters are only required in lengths exceeding 150-250 km).

71 *See Is OC3 Bandwidth Still a Good Choice?,* GIGAPACKETS, http://bit.ly/1iUGlYm (last visited Apr. 13, 2014) (noting that the typically lower costs of Ethernet equipment, which are packet switched, as opposed to the costs of switching TDM SONET equipment, can be advantageous to end users).

72 *See* Ray Le Maistre, *Deutsche Telekom: A Software-Defined Operator*, LIGHT READING (Oct. 16, 2013), http://ubm.io/1BYqzKl (carriers are switching to software-defined networks to reduce costs which enables networks to be reconfigured without having to dispatch technicians).

73 *See* Kaushik Das, *IP Based Technologies,* IPv6, http://bit.ly/1sA1v3Z (last visited Sept. 12, 2014) (examples include consumers adopting Netflix, a web-based, IP television service over traditional television).

networks, customers and network providers are gradually moving away from TDM services and copper networks to clear the way for these new solutions.[74] In addition, the convergent nature of IP networks has attracted both telecom investment and consumer interest.[75] As more and more customers and businesses move to fully IP networks, the cost and difficulty in maintaining TDM networks have increased relative to a shrinking user base.[76]

Three trends in particular have driven this adoption of IP services and the retirement of TDM networks.[77] First, most businesses have moved their telephony to fully digital equipment based on Session Initiation Protocol (SIP).[78] This allows telephones to operate over the same commodity networking gear as computers,[79] rather than relying on specialized digital and analog switching equipment.[80] It also means that companies can communicate globally with their own "global" private branch exchanges.[81]

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74 *See* Sean Buckley, *FCC Begins Voluntary TDM-to-IP Experiments,* FIERCETELECOM (Jan. 31, 2014), http://bit.ly/1z3WKHg (it is important to recognize here that providers are moving away from TDM services no matter the carrier medium; operators are upgrading from TDM to IP in wired residential networks, wired commercial networks, and wireless networks).

75 *See* Jeremy Helfand, *Critics Beware: TV Everywhere Delivers in 2013*, FORBES (Mar. 18, 2013), http://onforb.es/1sF8WN3 (noting that consumers now expect content that was once confined to purpose-built cable television networks to be available on any device).

76 *See In re* AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, *Comments of Verizon and Verizon Wireless*, WC Docket No. 12-353, RM-11358, 5-6 (Mar. 5, 2013) (available via FCC Electronic Comment Filing System) ("[C]able broadband services are now available to at least 93 percent of U.S. households as well as a high percentage of businesses. According to the Commission's data, approximately 38 percent of U.S. households subscribed to cable broadband services as of December 2011.")

77 *See* Carol Wilson, *The Dwindling Case for Saving TDM,* LIGHT READING (May 6, 2011), http://ubm.io/1wL8NGc ("Much of the talk around replacing TDM switches has focused on the many benefits of IP transformation – new service opportunities, fixed-mobile convergence and more efficient and lower-cost network operations.").

78 *See* William Stallings, *The Session Initiation Protocol*, INTERNET PROTOCOL J. (Mar. 2003), *available at* http://bit.ly/13y4KmW (noting that older PBX hardware is being phased out in many corporate environments in favor of SIP). The Session Initiation Protocol (SIP) is a communications protocol for multimedia communications such as voice and video. *Id.* Devices which conform to SIP can communicate in a variety of ways, including voice calls, video conferencing, instant messaging, and facsimile over IP. With SIP, the data network is configured to provide voice calls as but one out of many available communications services. *Id.*

79 In fact, most digital SIP phones are designed with this result in mind by including a built in network switch so that a computer can be plugged into the phone, which is then plugged into a network port. Thus, a single network port serves both the need for computer networking and telephony. *See* CISCO SIP IP PHONE 7960 ADMINISTRATOR GUIDE (CISCO SYS., INC. 2000), *available at* http://bit.ly/1wh0Cme.

80 *See* Stallings, *supra* note 78

81 *See id.* (companies can configure SIP servers that enable their employees to communicate directly, over IP networks, no matter their location. For example, an employee in

Second, the proliferation of smartphones and mobile data has dramatically increased the data requirements of cellular sites.[82] While 2G and 3G networks could be supplied with DS1 and DS3 backhaul, a single LTE user can now saturate a DS3 link.[83] Mobile devices evolved from being mobile productivity tools with an emphasis on low throughput voice services to the primary means of communication for many consumers.[84] And third, competitive IP television networks are now overwhelming the capabilities of consumers' DSL connections.[85] For instance, during the first half of 2013, online video services accounted for more than forty-nine percent of all Internet traffic.[86] These services are attractive to consumers because they are available not only on television, but on computers, consoles, set top boxes, and mobile devices.[87] The consequence of this, of course, is that these devices require ever more data on ever more networks.

C. Current Regulations Favor IP Networks Over TDM

In addition to the technical advantages of IP networks over TDM networks, there are regulatory conditions that favor the construction of new IP networks over the maintenance of TDM networks.[88] First, TDM networks that provide

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Washington, DC might dial his co-worker's four-digit office extension. The company SIP server would route the call to wherever that co-worker's phone was registered, whether that be in the Washington, DC office, a cellular telephone, or the branch office in Berlin, Germany. This is a powerful tool, as even small businesses can afford to have a global presence with only commodity computers and desktop phones).

82 *See* FUJITSU NETWORK COMM. INC., 4G IMPACTS TO MOBILE BACKHAUL 1-2 (2009), (noting that mobile use of 4G LTE protocols will force cell site upgrades to include Ethernet backhaul service).

83 *See id.* (note that LTE networks can deliver more than 40 Mbit/s of throughput, which is the speed of a DS3 link); *see also Wholesale: Products & Services,* CENTURYLINK, http://bit.ly/1wh10kJ (last accessed November 8, 2014) ("Digital Signal Level 3 (DS3) service consists of a high capacity channel provisioned for transmission speeds of 44.736 Megabits per second (Mbps) isochronous serial data.").

84 *See The Evolution of Cell Phone Design Between 1983-2009,* WEBDESIGNERDEPOT (May 22, 2009), http://bit.ly/1aDzSNp (demonstrating how important cellular phones are becoming in North America).

85 *See* Janko Roettgers, *AT&T's New Bandwidth Cap Is Bad News for Netflix*, GIGAOM (Mar. 14, 2011), http://bit.ly/1aDzSNp (explaining that users may hit their data caps in as little as three hours).

86 Peter Kafka, *Netflix + Youtube = Half Your Broadband Diet*, ALLTHINGSD (Nov. 11, 2013), http://bit.ly/1i2s8Lv (referring to the chart that shows that Netflix and Youtube, two popular online video services, accounted for an aggregate of approximately 49% of Internet traffic during the first half of 2013).

87 *How Does Netflix Work?*, NETFLIX, http://nflx.it/1wZboiV (last visited Apr. 13, 2014).

88 *See* Elise Ackerman, *FCC Calls for More Feedback on Switch to New, National*

traditional telephone service are required to offer choices in long distance providers.[89] This regulatory distinction is meaningless when all voice traffic is routed over fiber backbone. Customers now expect long distance calls to cost the same as local calls, and this has been the norm for cellular telephone users for over a decade.[90]

Second, TDM networks that provide traditional telephone service are required to provide "dialing parity," which enables Competitive Local Exchange Carriers (CLECs) to offer telephone service over the lines of incumbents.[91] Designed for an era when incumbents would disadvantage competitors by slowing phone connections or requiring inconvenient dialing prefixes, the widespread availability of affordable and competitive services rendered this obsolete.

Third, ILECs are required to maintain their TDM assets and must make requests to the FCC before discontinuing legacy services.[92] This is an extremely burdensome requirement, designed to ensure universal service during ILEC monopolies.[93] However, this requirement makes little sense today because ILECs are actively seeking to replace TDM assets with IP technology, yet are still being required by the FCC to keep legacy systems operational.

Finally, operators of TDM networks are required to lease them to competitors at regulated rates as part of special access and unbundling requirements.[94] For the owners of networks, this means that competitors can resell the net-

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Based Phone Network; Punts on AT&T Request, FORBES (May 12, 2013, 8:26 PM), http://bit.ly/1z3WKHg (discussing the FCC's proposed geographic trials).

89 *In re AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*, Petition, WC Docket No. 12-353, 18 (Nov. 7, 2012) (these are known as "equal access" obligations).

90 *Id.* at 19.

91 *Id.*; *see also* Telecommunications Act, 47 U.S.C. § 251(b)(3) (2012); 47 C.F.R. § 51.209 (2013).

92 *In re AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*, Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, WC Docket No. 12-353, 13 (Nov. 7, 2012).

93 *See* § 214(e) (which describes the universal service principles required when considering this provision of the law); *see also id.* § 214(a) (providing that no carrier shall discontinue service without first obtaining a certificate from the Commission).

94 *See In re* Technological Transition of the Nation's Communications Infrastructure Petitions for Rulemaking and Clarification Regarding the Commission's Rules Applicable to Retirement of Copper Loops and Copper Subloops, *Comments of Verizon and Verizon Wireless*, WC Docket No. 12-353, 24 (Mar. 5, 2013), (citing to *In re AT&T Petition To Launch a Proceeding Concerning the TDM-to-IP Transition; Petition of the National Telecommunications Cooperative Association for a Rulemaking To Promote and Sustain the Ongoing TDM-to-IP Evolution*, Comments of Verizon and Verizon Wireless, GN Docket No. 12-353, 28 (filed Jan. 28, 2013)) (available via FCC Electronic Comment Filing System).

works and compete using the infrastructure that the owner has paid for.[95] From the perspective of competitors, these arrangements are the only way that smaller firms can make inroads into the territory of an incumbent.[96]

These regulations are important to consider not only for how they affect current networks, but for how they affect future network plans.[97] The regulations require employee time to administer and specially designed equipment for compliance.[98] The equipment in particular is problematic, because integrating older networks with newer, upgraded services is often difficult and expensive.[99] Both of these issues present major challenges for the firms that are regulated because the systems that comply with the regulation must be operated no matter how few customers are still using the regulated product. For instance, between 2001 and 2011, the number of circuit switched landline telephones declined by over forty percent.[100] Despite the decline, providers of these services must continue to comply with the regulations, while the wireless firms and cable firms who provide telephone service remain unencumbered by them.[101]

III. THE FCC PROCEEDING: MOVING TOWARDS THE IP TRANSITION

As a result of the industry shifts described above, AT&T petitioned the FCC on November 7, 2012, asking to begin trials of fully-IP services in discrete wire centers of the country.[102] The petition described AT&T's investments in IP networks and argued that these new networks should not be burdened with regulations tailored to legacy TDM networks.[103] To spur the transition to IP networks in those wire centers, AT&T asked for elimination of regulations that

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95 *See id.* (arguing that competitors should not have access to the network that it paid for and endured business risk to construct).

96 *See Comments of Telepacific Communications*, *supra* note 24, at 14 (arguing that the FCC should implement Sections 251 and 271 imposing common carrier burdens on all providers of communications).

97 *See Comments of Verizon and Verizon Wireless*, (Declaration by Claire Beth Nogay), *supra* note 94 at paras. 3-6 (available via FCC Electronic Filing System) (discussing Verizon's decision to deploy an FTTP network, the largest investment in an FTTP network).

98 *See id.* at para. 19.

99 *See id.* (Declaration by Claire Beth Nogay) (noting that Verizon must maintain separate customer support operations for its legacy services, at additional cost relative to upgraded fiber networks).

100 IP TRANSITION AS A GRAND CHALLENGE: REMARKS BY FORMER WIRELESS COMPETITION BUREAU CHIEF SHARON 1 (June 15, 2012), *available at* http://fcc.us/1AGPM8d.

101 *In re AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*, Petition, WC Docket No. 12-353, 10 (Nov. 7, 2012) (arguing that cable and wireless companies do not face the common carrier regulations that are faced by ILECs).

102 *See generally id.* (asking the Commission to transition away from legacy systems).

103 *Id.* at 11-12.

typically apply to TDM networks, reasoning that networks with fewer burdensome regulations will be constructed faster.[104] The FCC initiated a rulemaking and sought comments on the proposal.[105] The ongoing rulemaking has resulted in two major categories of commenters: the ILECs and their competitors.[106] The competitors include smaller CLECs, cable operators, and other data providers.[107]

A. Incumbent Carriers: Imposing Legacy Regulations Will Stifle Investment

The first category of commenters was incumbent wireline providers.[108] The most prolific of these was Verizon, who submitted both a lengthy comment and a Declaration by its Senior Vice President of Network Planning and Administration.[109] Since 2004, Verizon has been replacing its legacy telephone and DSL service with FiOS, an all fiber optic network service.[110] Verizon's concerns are twofold: that the application of legacy wholesaling requirements will provide a windfall for its competitors that did not endure the risk of new investment,[111] and that its current obligations to maintain its remaining copper network are reducing the amount of capital available to invest in fiber deployment.[112]

The second concern is particularly troubling, especially from a public policy standpoint. The FCC has a general duty to ensure that all Americans have access to advanced communications technologies, and its regulations should promote that result.[113] The regulations should not hinder that goal by restraining a market competitor from upgrading its network.

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104 *Id.*

105 *See In the Matter of Technology Transitions, AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*, GN Docket No. 13-5, GN Docket No. 12-353, 29 FCC Rcd 1433, para. 5 (Jan. 30, 2014).

106 Leslie M. Marx, *AT&T IP Transition Petition*, DUKE U.: TELECOM. POLICY BLOG (Nov. 15, 2012, 1:22PM), http://bit.ly/1wh2OtZ.

107 *Id.* (competitors include cable operators, such as Comcast, and data providers, such as T-Mobile).

108 These include AT&T, Verizon, and Centurylink. *See, e.g.*, *Comments of Verizon and Verizon Wireless*, *supra* note 76; *In re* AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, *Comments of Centurylink*, GN Docket No. 12-353 (March 5, 2013) (available via FCC Electronic Comment Filing System).

109 *See, e.g.*, *Comments of Verizon and Verizon Wireless*, *supra* note 76.

110 *Verizon Corporate History*, VERIZON, http://vz.to/1wFCcCR (last visited Feb. 16, 2014).

111 *Comments of Verizon and Verizon Wireless*, *supra* note 76, at 24-25 (March 5, 2013).

112 *Id.* at 17.

113 *What We Do,* FCC, http://fcc.us/1oty953 (last visited Sept. 12, 2014).

B. Competitive Carriers & Others: Regulations Are Necessary for Wireline Competition

A variety of competitors argue against the incumbent carriers. The most vocal and traditional opponents are the CLECs, which compete with the incumbent carriers for residential and business customers.[114] Importantly, they rely on the networks of incumbent carriers to reach customers, and often do not have last-mile facilities of their own.[115] However, the networks that they use are typically the legacy TDM networks, which have all of the disadvantages that are pushing incumbents to upgrade.[116]

Also voicing some opposition to ILECs are cable providers, who cautiously note that they have to connect their networks to those of the ILECs.[117] While cable providers are well positioned technologically with hybrid fiber and coaxial networks, they recognize that ILECs still maintain significant market penetration.[118] The cable operators are especially worried that the IP transition will harm existing norms of interconnection for IP networks given the market power of the ILECs.[119]

The final group voicing concern is made up of public interest organizations, who argue that the movement to all-IP networks should not result in the expiration of regulations intended to protect consumers.[120] These groups worry that the transition to IP-based services will lead to higher service prices for consumers, and that the replacement services will not offer all the features that customers had with their previous services.[121] There is also concern that the

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114 *Comments of Telepacific Communications*, *supra* note 24, at 1-2.

115 *Id.* at 6.

116 *See Comments of Verizon and Verizon Wireless*, *supra* note 76, at 16 (noting that copper-based TDM networks are distance sensitive, unlike newer fiber loops).

117 *In Re* AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, *Reply Comments of Cox Communications, Inc.*, GN Docket No. 12-353, at 5 (Jan. 28, 2013) (available via FCC Electronic Comment Filing System).

118 *Id.* at 1 (noting that there is widespread agreement among cable and CLECs that ILECs still possess significant market power).

119 *See id.* at 5-6 (expressing concern of the continued availability of interconnection between ILECs and cable operators given the market power of some ILECs, while providing examples of interconnection disputes that have arisen).

120 *See* Jodie Griffin & Harold Feld, *Five Fundamentals for the Phone Network Transition*, PUB. KNOWLEDGE (July 2013), http://fcc.us/1oty953 (arguing that the regulations protect its customers first).

121 Bruce Kushnick, *Fire Island Erupts Over Verizon's Wireless Voice Link: New York AG Claims Verizon Violated Agreement*, HUFFINGTON POST (July 3, 2013), http://huff.to/1zt1bdy. After Hurricane Sandy destroyed the copper phone lines on Fire Island, residents were told that those customers whose lines were destroyed would have their service replaced with Voice Link, a wireless substitute. Verizon eventually agreed to replace the telephone lines with its fully fiber optic FiOS network after widespread public outcry. *Id.*

new services will not function during emergencies because the data lines are not self-powered.[122] Many consumers themselves have also voiced outrage at the cost of service upgrades, especially when they were only using basic service tiers to begin with.[123]

IV. THE HIDDEN TRAP: SPECIAL ACCESS RATES

A. Background: What is Special Access?

Technology changes are one thing, but the telecommunications industry is also undergoing a shift in the pricing structure that underpins consumer and business services. Those changes are occurring in "special access" services.[124] While most consumers do not directly encounter special access network services, they rely on them for most of their daily communications interactions.[125] Special access refers to a variety of network technologies, but all are designed as dedicated connections between facilities.[126] The businesses and institutions that rely on special access are just as diverse; they include large institutions providing data access to their campuses, banks connecting ATM machines to their network, manufacturers connecting factories to corporate headquarters, and cellular providers linking the individual cell sites to the providers' network.[127] In all of these instances, a special access customer pays a provider for a dedicated line connecting their facility to the provider's central office, and from that central office, a connection may be completed to the customer's intended destination.[128]

The majority of special access services are provided by AT&T, Verizon, and Century Link, each descended from the original AT&T monopoly.[129] As such, they operate and are regulated as common carrier ILECs, and they are required

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122 *Surprise! Your High-Tech Home Phone System Could Go Dead In An Emergency*, CONSUMER REP. (Jan. 2012), http://bit.ly/13ygTYW.

123 *See* Liz Crenshaw & Patti Petitte, *Killing Copper? Customers Say They Felt Pressured Into FiOS*, NBC WASHINGTON (Dec. 10, 2013), http://bit.ly/1cmJ1er (detailing the experiences of customers that Verizon upgraded to fiber optic FiOS services over basic copper telephone service).

124 *In the matter of Special Access for Price Cap Local Exchange Carriers*, Report and Order, WC Docket No. 05-25, RM-10593 27 FCC Rcd 10557, n. 1 (Aug. 22, 2012) (*LEC Special Access Price Cap Order*).

125 *See LEC Special Access Price Cap Order*, 27 FCC Rcd 10557 para. 2.

126 *Id.* at n. 1.

127 *See id.* at para. 2 (discussing enterprise and governmental users of the network).

128 Cary E. Adickman, *Special Access: The Harm of Premature Deregulation in Telecommunications*, 31 CARDOZO ARTS & ENT. L.J. 113, 117 (2012).

129 *Id.*

to submit tariffs for their special access services.[130] Especially in rural areas, special access services are often the only form of data access available, and these services are needed to connect remote facilities to larger networks.[131] In urban areas, competition has emerged from business Ethernet services and cable internet services, but even in dense locations, a single ILEC usually wields significant market power.[132]

Traditionally, special access services were provided over copper TDM facilities such as T1/DS1 lines.[133] These older facilities are often still in place in rural areas, or in smaller single tenant buildings.[134] Today, the majority of special access services are provided over newer OC1 and OC3 fiber lines.[135] While the fiber lines do offer increased throughput and performance versus the older copper T1 lines, they often still rely on TDM equipment, which is difficult to source and maintain.[136] Special access customers are also increasingly demanding Ethernet services, which use more standardized IP equipment and faster data rates.[137]

B. The FCC's Related Special Access Proceeding . . . and Unfinished Business

Even so, with increased competition from cable and fiber alternatives to traditional special access providers, the FCC initiated rulemaking to decide whether the complex system of regulations on special access tariff rates should

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130 *Id.* (discussion in footnotes 86-87; these entities are regulated under "price-cap" regulations).

131 *See LEC Special Access Price Cap Order* 27 FCC Rcd 10557 para. 3 (Aug. 22, 2012) (noting that the American Petroleum Institute has expressed concerns that its members' facilities are located in isolated conditions with little facilities-based competition).

132 *See In re* AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, *Comments of XO Communications*, LLC, GN Docket No. 12-353, 25-26 (Jan. 28, 2013) (available via FCC Electronic Comment Filing System); (explaining that even in urban areas where competition would be expected, competitors are often still faced with significant market power from ILECs).

133 *See How DS1 and DS3 Bandwidth Are Related*, DS3 TODAY, http://bit.ly/1oadEOV (last visited Sept. 13, 2014) (noting that the T-carrier system dates back to the 1950s).

134 *See* Peter Bluhm & Dr. Robert Loube, *Competitive Issues in Special Access Markets*, NAT'L. REG. RES. INST., (Jan. 21, 2009), http://bit.ly/1sAeWkl (concluding that T1/DS-1 lines are typically prevalent in rural areas, where there is significant ILEC market power).

135 *Id.*

136 *See* Ray Le Maistre, *Deutsche Telekom: A Software-Defined Operator*, LIGHT READING (Oct. 16, 2013), http://ubm.io/1BYqzKl (carriers are switching to software-defined networks to reduce costs, because TDM equipment is often only defined in hardware, requiring costly technician dispatches).

137 *See Is OC3 Bandwidth Still a Good Choice?,* GIGAPACKETS, http://bit.ly/1iUGlYm (last visited Aug. 26, 2014) (noting that the costs of Ethernet equipment, which are packet switched, are typically much lower than the costs of circuit switched TDM SONET equipment; end users demand the lowered costs available with Ethernet hardware).

be allowed to expire.[138] At the heart of the dispute: how should the FCC determine whether there is sufficient competition to permit deregulation? Should the FCC take action if there is "insufficient" competition? What of the previously set rates?

The most difficult question for the FCC was exactly what data should be collected and analyzed, and how to determine whether it points to market power.[139] From the perspective of customers and resellers of special access, the ILECs held too much market power, and measurements over entire Metropolitan Statistical Areas (MSAs) were inaccurate because they overstated the value of competition in a few dense, urbanized centers.[140] Some customers, especially wireless carriers, were frustrated by the lack of affordable special access connections that are needed to underpin wireless networks.[141] ILECs, on the other hand, lamented that obsolete TDM services such as DS1 and DS3 lines were being considered part of their market footprint while customers demanded faster Ethernet solutions.[142] To make matters worse, under current regulations, ILECs are required to maintain their TDM networks in operational status unless they get permission from regulators to shut them down.[143]

The result of the FCC's special access proceeding was an order suspending the previous regime of special access tariff requirements.[144] A divided commission concluded that while regulation of special access rates was needed, the data collected was ambiguous at best, and that continuing to regulate an industry on old premises was worse than the potential harm of allowing monopoly

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138 *See LEC Special Access Price Cap Order* 27 FCC Rcd 10557 para. 76 (Aug. 22, 2012) (initiating a process to identify where such relief would be appropriate).

139 *See id.* at para. 5 (suspending the usage of "collocation triggers" as an indicator of the competition level in wire centers following 13 years of experience and other evidence on the record).

140 *Id.* at para. 54. Competitive resellers argue here that even deploying to lateral buildings can be prohibitively expensive because of costs including municipal franchise delays, rights-of-way agreements, building access agreements, and building and zoning permits. *Id.*

141 *In re* Special Access Rates for Price Cap Local Exchange Carriers, *Comments of T-Mobile USA, Inc.,* WC Docket No. 05-25, at 2 (Aug. 8, 2007) (available via FCC Electronic Comment Filing System) (noting that the difficulties in provisioning special access for UMTS circuits would carry over to its newer 4G LTE network).

142 *See In re* Special Access Rates for Price Cap Local Exchange Carriers, *Comments of AT&T Inc.,* WC Docket No. 05-25, at 10 (Feb. 11, 2013) (available via FCC Electronic Comment Filing System) (noting that intrusive regulation of legacy TDM services may threaten the transition to new Ethernet alternatives).

143 *In re* AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, *Petition*, GN Docket No. 12-353, at 11 (Nov. 7, 2012) *see also* 47 U.S.C. 214(a) (2012) (requiring that carriers seek approval from the FCC before discontinuing service).

144 *See LEC Special Access Price Cap Order* 27 FCC Rcd 10557, para. 5 (Aug. 22, 2012).

prices on special access services.[145] The dissenting commissioners expressed concern that the collected data was insufficient, and that the commission should not change course without good reason to do so.[146]

Shortly after the suspension, AT&T announced that it would discontinue its discounted 5-year contract terms on many of its special access services, including DS1 and DS3 lines.[147] AT&T pointed out that phasing out these services was necessary to move to new IP technology.[148] In response, a variety of customers and resellers petitioned the FCC to halt the proposed changes, arguing that this was not a move to adopt IP-based technology, but was instead a move by AT&T to raise rates following the FCC's suspension.[149]

The result was more uncertainty. The FCC ordered that the tariff changes be suspended for five months while it investigates tariff rates in conjunction with its consideration of the IP transition.[150] Within the five month investigation, AT&T quietly rescinded its proposed rate changes.[151] As a result, the FCC terminated the investigation because the withdrawal of the tariffs rendered the investigation moot.[152] This result would appear to leave providers of special access services wondering whether they can upgrade their networks if they cannot pass the costs of increased speeds along to customers, and it gives only temporary reprieve to users of special access services.[153] One can only wonder what the FCC would have decided had the investigation been completed.

V. IS IT TIME FOR UNIFIED TREATMENT OF SERVICES UNDER COMMON CARRIER REGULATION?

The incumbent LECs, competitive LECs, cable companies, wireless companies, and even the FCC itself are avoiding a difficult and politically dangerous

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145 *See id.* at 85-90 (compare the statement of Chairman Julius Genachowski with the dissenting statement of Commissioner Robert M. McDowell).

146 *Id.* at 88-90 (Commissioner Robert M. McDowell dissenting).

147 *In re Suspension and Investigation of AT&T Special Access Tariffs*, Report and Order, WC Docket No. 13-299, 28 FCC Rcd 16525 at para. 1 (Dec. 9, 2013).

148 *Id.* at 2-3.

149 *See, e.g.*, *In re* Suspension and Investigation of AT&T Special Access Tariffs, *Petition to Suspend and Investigate by XO Communications,, LLC,* WC Docket No. 13-299, at 4-5 (Dec. 3, 2013) (arguing that AT&T is attempting to force customers to necessarily upgrade their plans).

150 *In re Suspension and Investigation of AT&T Special Access Tariffs*, 28 FCC Rcd 16525, at paras. 6, 8 (Dec. 9, 2013).

151 *In the Matter of Suspension and Investigation of AT&T Special Access Tariffs*, Order, WC Docket No. 13-299 29 FCC Rcd 1782 at para. 3 (Feb. 19, 2014).

152 *Id.* at para. 4.

153 *See id.* While the increased tariffs have been retracted, there is no guarantee that AT&T or any other ILECs will not attempt a tariff increase in the near future. *Id.*

question: is it time for all network services to be classified as a common carrier under an antitrust framework? While many have argued that reclassification should be avoided lest the promise of IP networks be stifled,[154] this Comment aims to demonstrate there is a real need for reclassification.

Current regulations create several serious problems.[155] First, they alter the market by treating some services differently than others.[156] The best example of this is the rising dominance of cable firms as serious competitors to the traditional telephone companies.[157] Unlike telephone companies, cable providers are not required to lease their lines to competitors at regulated rates because cable broadband service has been classified by the FCC as an "information service," which does not fall under common carrier regulation.[158] Cable firms are also only regulated in pricing and availability by their local franchising agreements, and even there, they are only regulated to the extent of their basic cable television pricing and availability.[159] This is again the result of cable broadband being classified as an information service.

It is important to note that, although DSL services were reclassified as information services in 2005 to bring them in line with cable broadband, dominant ILECs are still required to lease special access lines at regulated rates to competitors.[160] This distorts the market for commercial access because businesses will often substitute unregulated Ethernet or cable broadband offerings from cable companies for the regulated special access products of ILECs. These regulations signal that upgrades made to cable networks will remain in the full control of cable providers, while upgrades made to ILEC networks can be

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154 *See Comments of Verizon and Verizon Wireless*, *supra* note 76, at 24 (arguing that competitors that did not bear the risk of constructing new fully IP networks should not be entitled to use those networks constructed by others).

155 *See, e.g.,* Marguerite Reardon, *Broadband CEOs to FCC: We're Not a Utility*, CNET (May 13, 2014), http://cnet.co/QG8bAy (arguing that the current regulations may lead to a "fast lane" for paying services at the expense of non-paying services).

156 *Id.*

157 Leslie Cauley, *Consumers Ditching Land-Line Phones*, USA TODAY (May 14, 2008), http://usat.ly/1sFtg0J (noting that many customers now use cable telephony for home phone service rather than lines from traditional telephone companies).

158 *See* Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Serv., 545 U.S. 967, 969 (2005).

159 *Evolution of Cable Television*, FCC, http://fcc.us/1puLKvK (last updated Mar. 14, 2012).

160 *LEC Special Access Price Cap Order* 27 FCC Rcd 10557, at para. 8-10 (Aug. 22, 2012) (at issue here are the regulated rates that competitors pay to lease parts of an ILEC's special access network); *see also* Marguerite Reardon, *FCC Changes DSL Classification*, CNET (Aug. 5, 2005), http://cnet.co/1whio92. In 2005 the FCC reclassified DSL services as "information services," which meant that telephone companies were no longer required to make that portion of their network available to competitors; however, competitors still have access to last-mile copper loops, over which they can provision DSL services. *Id.*

utilized by competitors.[161] The result is ILECs have little incentive to invest in special access assets, giving cable operators an artificial advantage in the marketplace.

Second, the regulations ignore the growing market power of non-ILEC firms. The regulatory advantages enjoyed by cable firms, combined with newer networks, have made cable the *de facto* high-speed provider in the majority of American markets.[162] This means that even among Americans who have a choice between DSL and cable broadband, the cable broadband is typically the only option suitable for high-bandwidth applications such as streaming video, telework, and data backups.[163] That cable broadband is the only serious option for high-speed broadband for the majority of Americans has not gone unnoticed by the FCC.[164]

Lastly, regulations fail to acknowledge that the public increasingly uses all services, whether TDM or IP, as common carrier data, to be provisioned as necessary between voice, video, and data services. For example, recent statistics demonstrate about fifty percent of web traffic can be attributed to Netflix and YouTube, both of which are online video providers.[165] Customers that have abandoned traditional landline telephones have nonetheless adopted voice over IP solutions, even where they also have the option of using mobile phones.[166] There is also a growing legion of consumers that has forgone traditional cable services completely, opting to view television programming from Internet sources.[167] On one hand, these developments are positive news for consumers, who have greater choice beyond their local providers for communications and entertainment. However, access to all of these competitive services requires a

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161 Marguerite Reardon, *FCC Changes DSL Classification*, CNET (Aug. 5, 2005), http://cnet.co/1whio92 .

162 *See Broadband Statistics Report: Access to Broadband Technology by Speed*, NAT'L BROADBAND MAP (July 2013), http://1.usa.gov/1uTgHcj (graph entitled "Wireline Broadband Availability by Speed (% of Population)", note that the majority of speeds greater than 10 Mbit/s are provided by cable).

163 *See Internet Connection Speed Recommendations,* NETFLIX, http://nflx.it/13b43z1 (last visited Sept. 13, 2014) (note that a typical 6 Mbit DSL connection would only be able to handle a single HD stream, and would be unable to handle Super HD or 3D streams).

164 *See* TOM WHEELER, CHAIRMAN, FED. COMM. COMM'N, THE FACTS AND FUTURE OF BROADBAND COMPETITION, PREPARED REMARKS DELIVERED AT 1776 HEADQUARTERS (Sept. 4, 2014), *available at* http://bit.ly/1o1tQ0F.

165 Joan E. Solsman, *Netflix, YouTube Gobble Up Half of Internet Traffic*, CNET (Nov. 11, 2013), http://cnet.co/1J3bWro.

166 *See* Christie Morales, *Cheap Phone Calls Hang in the Balance in Tug-of-War Between FCC, Cable Giants*, SAN FRANCISCO PUBLIC PRESS (June 24, 2010), http://bit.ly/1z4gScb (noting that voice over IP, or VoIP, is increasingly used by immigrant communities to make phone calls to distant countries).

167 Jim Edwards, *Cable TV CEO Is 'Surprised' That 1.3 Million Of His Customers Want The Internet But NOT Television*, BUS. INSIDER (Nov. 5, 2013), http://read.bi/1gcMowd.

high bandwidth broadband connection, which in many areas is only provided by one or two firms.[168] Even more troubling is the firms providing broadband typically offer their own competing services and have incentive to use their market power as broadband providers to unfairly advantage their voice and video services.[169]

To remain effective under these changing market conditions, regulations must be rewritten to encourage the broader transition to all-IP networks.[170] This requires the adoption of several principles.[171] First, every company providing communications infrastructure must be equally accounted for under the rules. Singling out ILECs for scrutiny and regulatory burden only serves to disadvantage them precisely when they are trying to build out new IP networks.[172] The current rules do not serve the goal of increased competition because they only enable CLEC entry in areas where there is an ILEC that continues to employ TDM infrastructures. In areas where the ILEC has upgraded to IP infrastructure, or where only a cable operator provides service, current policies do nothing to increase competition.[173]

Second, the rules must be technology agnostic. Remaining agnostic ensures the market, rather than the preferences of regulators, drives the choice between TDM and IP infrastructure.[174] This approach acknowledges that in many regions, TDM infrastructure is inadequate to serve the communications demands of businesses and residents.[175] However, it also recognizes that TDM technolo-

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168 *See* FED. COMM. COMM'N, INTERNET ACCESS SERVICES: STATUS AS OF DECEMBER 31, 2012 9 (Dec. 31, 2012), *available at* http://bit.ly/11gvQ0E (noting that at speeds greater than 10 Mbit/s downloads, the FCC estimates that only 33% of households have access to three or more providers of broadband. The FCC did caution, however, that these statistics should not be used to judge market competition).

169 *See Why Choose Xfinity?*, COMCAST, http://xfin.tv/1AcmUGF (last visited Sept. 13, 2014) (Comcast sells not only broadband service but also cable television and telephone service).

170 *In the Matter of AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*, Petition, GN Docket No. 12-353, at 6-7 (Nov. 7, 2012) [hereinafter *AT&T Petition*].

171 *See id.* at 1-2.

172 *See id.* at 5 (this "singling out" is relative to cable companies and wireless companies, which compete with similarly large broadband networks and which are not subject to legacy common carrier regulations).

173 *See Comments of Telepacific Corporation*, *supra* note 24 at 12 (available via the FCC Electronic Comment Filing System) (noting that in areas where an ILEC has deployed fiber, competitors are limited to leasing a single 64 kb/s channel, which is only usable as a single phone line).

174 *In the Matter of AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*, Petition, GN Docket No. 12-353, at 6 (Nov. 7, 2012).

175 A glance at the coverage maps of many cellular providers confirms this. In many rural areas, cellular coverage is provided by national carriers, but only using 2G technologies and data rates. This is because the faster speeds of newer cellular technologies required

gies can be readily adapted to carry IP services and that this is still a viable choice in regions where revenues cannot support deployment of new IP infrastructure.[176]

Third, the rules must accurately evaluate the communications infrastructure across the nation to determine where competition is adequate and where it is not. To do this, regulators must decide what the market is and how to measure competition within geographical areas.[177] Such a system must account for high-bandwidth broadband options in a meaningful way by considering prices and speeds that are available to businesses and consumers.[178] A significant challenge will be to ensure that the test remains relevant even as broadband speeds increase. While these three principles are useful guides for improving the regulation of fixed broadband services, further elaboration is required. Next, this Comment discusses how each of these principles can be used to promote broadband competition in an IP environment.

A. Network Operators Should Be Treated Equally

Treating network operators equally is the most important piece of any new rules that the FCC creates to address the IP transition. The competitive landscape of the broadband marketplace has changed dramatically since the breakup of the original AT&T monopoly, and continuing disparate legal treatment of its descendants is not only unproductive, but it is not grounded in the facts.[179]

Originally, the FCC promulgated regulations that were directed at the remaining market power of the ILECs.[180] These regulations kept ILECs out of

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enhanced cell site backhaul to provide the data. *See also* FUJITSU NETWORK COMM. INC., 4G IMPACTS TO MOBILE BACKHAUL 8 (2009), *available at* http://bit.ly/1ApiydF.
(noting that mobile use of 4G LTE protocols will force cell site upgrades to include high speed Ethernet backhaul service).

176 *See also id.* at 1.

177 *See Comments of Telepacific Corporation, supra* note 24.

178 *See id.* at 10-11.

179 The requirements that ILECs allow customers to select a long distance provider. This was during a time when all customers typically relied on a single ILEC for all telephone service, and hence there was a presumption that a regulated monopoly existed. The rule was intended to ensure that customers could at least access a competitive market for long-distance telephone services. Today mobile and IP networks have rendered the distinction between local and long distance telephone calls meaningless, but the descendants of AT&T remain burdened with this regulatory command. *See also In the Matter of AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*, Petition, GN Docket No. 12-353, at 18 (Nov. 7, 2012) (these are known as "equal access" obligations).

180 *See* 47 C.F.R. § 36.191 (2013) (governing the provision of equal access equipment by ILECs, this permits competition for long distance service amongst Interexchange Carriers,

markets like data services and long distance telephony out of fear that the ILECs would inflict competitive harm on these markets as AT&T had done during the monopoly era.[181] The FCC also held that cable providers should be classified as information services, free of common carrier obligations, as a means to encourage competition against the ILECs.[182] Even in the telephony market, cellular service providers were provided competitive advantages over ILECs in that they did not have to participate in regulated long distance rates.[183]

Today, that historic narrative is out of date, and the regulations that remain do not serve to promote competition.[184] In some regions, customers have access to broadband services from several providers, such as a cable provider, an ILEC provider, a satellite provider, and a fixed wireless provider.[185] In that instance, only the ILEC provider is subject to a variety of legacy regulations designed to promote competition in telephone services.[186] Despite this, the cable provider, satellite provider, and fixed wireless providers all offer the telephone and broadband services in direct competition with the ILEC provider. This has had a profound effect on network investment, directing capital into new cable and wireless networks to the detriment of ILEC networks.[187] The best example of this is Verizon, which has aggressively sold legacy copper wiring in lower income territories, while upgrading those areas in wealthy areas to its fiber optic FiOS service.[188] Similarly, businesses in urban areas often have several providers to choose from for metro Ethernet services, while those in rural areas

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which would connect to an ILEC's central office to provide service to the ILEC's local customers).

[181] Bell operating company entry into interLATA services. 47 U.S.C. § 271 (2012) (prohibiting Bell operating companies and their affiliates from entering the long distance telephony market).

[182] *See* Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Serv., 545 U.S. 967, 969 (2005) (holding that the FCC was free to classify cable broadband service as either an information service or a telecommunications service depending on the facts that the FCC found).

[183] *See Local, Local Toll, and Long Distance Calling*, FCC, http://fcc.us/1r04CXw (last visited Sept. 13, 2014).

[184] *See also In the Matter of AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP* Transition, Petition, GN Docket No. 12-353 at 18-19 (Nov. 7, 2012).

[185] *See Broadband Service for the Home: A Consumer's Guide*, FCC, http://fcc.us/1GQkxts (last visited Aug. 24, 2014).

[186] *See Comments of Verizon and Verizon Wireless*, *supra* note 76, at 18 (noting that only ILECs are currently subject to legacy regulations).

[187] *See* Steve Donohue, *Comcast Dominates 2013 Broadband Subscriber Growth Rankings*, FIERCECABLE (Mar. 17, 2014), http://bit.ly/YXPvjP (Comcast, the nation's largest cable broadband firm, has added more customers than all of the largest telephone companies combined; investors will take note).

[188] Deborah Yao, *Verizon's Copper Cutoff Traps Customers, Hampers Rivals*, SEATTLE TIMES (July 10, 2007), http://bit.ly/1AHMnG2.

are left not only with a single ILEC, but one that has refused to upgrade its TDM facilities lest a competitor take advantage of the investment.[189]

Critics of this approach argue that opening networks to use by competitors will result in stagnant investments everywhere as investors are deterred from building new networks that a competitor will immediately snatch up without enduring the risk of investment.[190] However, this argument fails to account for several critical realities.

First, it ignores that incumbents have been voluntarily wholesaling their networks in other fields in order to maximize the return on their investments. In cellular telephony, all four of the major carriers resell their network capacity to Mobile Virtual Network Operators (MVNOs)[191] to maximize their network utilization, promote strong branding, and attract customers across the economic spectrum.[192] To a degree, the FCC's rules limit this potential in fixed communications by declaring that only ILECs must make their networks available.[193] Because this market is "served by default" by telephone companies in compliance with FCC rules, there is no incentive for cable and fiber operators to resell their networks, even voluntarily.[194]

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189 *See* AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, GN Docket 12-353, at 15 (Mar. 5, 2013) (accessible via FCC Electronic Comment Filing System) (noting that cable competitors such as Comcast are aggressively rolling out competing metro Ethernet services).

190 *See id.* at 21 (arguing that Verizon should not have to make its brand-new networks available to competitors that have not borne the investment risks).

191 Mobile Virtual Network Operators (MVNOs) are mobile telephony providers that do not operate their own cellular networks. Instead, they provide geographic coverage by leasing the networks of major providers. For the MVNOs, this is an opportunity to offer innovative and competitive services without the investment of a nationwide network. For the operators of networks, MVNOs offer the opportunity to fully utilize networks capital-intensive networks, even if the operator has difficulty selling services under its own brand. *See, e.g.*, *Mobile Virtual Network Operators*, ITU.INT, http://bit.ly/13you9T (last visited Sept. 13, 2014).

192 *See, e.g.*, Kevin Fitchard, *Why Are MVNOs So Hot Right Now? Thank the Carriers*, GIGAOM (June 25, 2012), http://bit.ly/Sy79bM (other reasons include reaping wholesale revenues and market pressure).

193 *In the Matter of Special Access for Price Cap Local Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, Report and Order, WC Docket No. 05-25, RM-10593, 27 FCC Rcd 10557 at 88-90 (Aug. 22, 2012) (Commissioner McDowell dissenting) [hereinafter *Special Access Price Cap AT&T Petition Order*].

194 This is an important distinction. In the mobile world, MVNOs typically serve poorer customers with a variety of prepaid plans, usually with phones that must be purchased outright rather than paid over the life of a contract. Even so, all four major mobile providers (i.e., AT&T, Verizon, Sprint, and T-Mobile) resell their fastest networks to MVNOs. By artificially segmenting the market for broadband and special access into firms that must resell their networks, and those who do not have to resell, the FCC has ironically limited the amount of network sharing that will occur in local markets where there is some competition.

Critics also ignore the market results in countries and industries that have adopted common carrier regulations. European nations have in many cases implemented unbundling regulations with great success for broadband.[195] In the United States, industries as diverse as railroads,[196] pipelines,[197] and electric power[198] are required to resell their networks at regulated rates.[199] Requiring networks to be resold would provide significant benefits, such as promoting competition and avoiding duplicative network build outs.[200] Requiring reselling also limits the ability of firms with market power to translate that power into dominance in related but competitive industries.[201]

Another important consideration is that even with "stagnant" investment, advances in processing power and signaling technology result in throughput improvements whether the wires themselves are upgraded or not. Copper twisted-pair,[202] copper coaxial,[203] and fiber networks[204] have all seen dramatic increases in throughput over the past several decades with virtually no change

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In those markets, the high cost provider which provides the fastest speeds has no incentive to resell because the low price market has been served, by default, by the ILEC's ageing TDM networks. The regulatory barriers to ILECs upgrading TDM networks also mean that they cannot apply competitive pressure on services from non-ILEC firms. *See also Comments of Verizon and Verizon Wireless*, *supra* note 76, at 21 (on how the National Broadband Plan's requirement that ILECs to maintain copper facilities in areas where they have deployed fiber would "reduce the incentive for incumbents to deploy fiber facilities.").

195 *See* D.I. Wolfgang Reichl, Ernst-Olav Ruhle, Martin Lunborg & Matthias Ehrler, *Virtual Unbundling the Basis for Competition in Next Generation Access Networks*, SBR JUCONOMY CONSULTING AG 7 (2010), http://bit.ly/1wLyC8Y (describing the European regulatory framework for network unbundling).

196 Railroads rates are regulated by the Surface Transportation Board. *See Overview of the STB*, SURFACE TRANSP. BOARD, http://1.usa.gov/1uZAOGV (last visited Sept. 13. 2014).

197 *See generally Oil: Regulating Oil Pipelines,* THE FED. ENERGY REG. COMM'N (Aug. 19, 2014), http://1.usa.gov/1r06Fej (explaining pipeline rates for oil are regulated by the Federal Energy Regulatory Commission).

198 *See generally Electric*, THE FED. ENERGY REG. COMM'N (Aug. 15, 2014), http://1.usa.gov/1wLz2vX (explaining long-distance electricity transmission rates are regulated by the Federal Energy Regulatory Commission).

199 *See* Lawrence R. Greenfield, *An Overview of the Federal Energy Regulatory Commission and Federal Regulation of Public Utilities in the United States*, THE FED. ENERGY REG. COMM'N, (Dec. 2010), *available at* http://1.usa.gov/1GsTLsJ.

200 *See Competition in Telecommunications Services*, FCC, http://bit.ly/1GsTO7V (last visited Aug. 26, 2014).

201 *See id.*

202 *See The Basics of Manufacturing UTP cables,* CABLING INSTALLATION AND MAINT. (Mar. 1, 2002), http://bit.ly/1GQnB8Y.

203 *See* Brian Volpe & Conrad L. Young, *What's Next for DOCSIS*, CED (Oct. 16, 2013), http://bit.ly/1wLzEBP (noting that throughputs have increased from a maximum of 38 Mbit/s in DOCSIS 1.x to the now-current 304 Mbit/s in DOCSIS 3.0).

204 *See* Darrin Woods, *Shining Light on Optical Networking*, NETWORK COMPUTING (Mar. 20, 2000), http://ubm.io/13ypZoN (noting that over time, fiber optic speeds have dramatically increased from OC-1 at 51.84 Mbit/s to OC-192 at 9953.28 Mbit/s).

in the transmission medium itself.[205] In other words, only an upgrade to central office equipment and customers' own equipment is often required to see greater throughput, which points to greater speed and choice for consumers even if investment in the buried wires themselves remains "stagnant."[206]

To implement these principles, the FCC must update its regulations to recognize those parts of the marketplace, which are competitive, and those that are not. For instance, 47 U.S.C. § 214 and 47 C.F.R. § 63.61 state that common carriers must seek permission from the FCC to establish or discontinue service.[207] However, only ILECs are affected by these provisions, because only they have been classified as common carriers.[208] Cable and wireless firms remain unaffected, and are free to change and discontinue services as needed to further their businesses.[209]

Another provision that disproportionately affects ILECs is 47 C.F.R. § 59.1, which requires that ILECs make their telephone networks available to competitors for use.[210] Unlike the requirements of service discontinuance, cable and wireless providers retain full control over their networks, and are not required to make them available to competitors.[211]

To modernize the legislative command of 47 U.S.C. § 214, and better tailor 47 C.F.R. § 59.1, the FCC should first classify all providers of communications networks as common carriers. In addition to reclassification, the FCC should use its discretion to forbear regulations where competition is sufficient to render service discontinuation requests and unbundling of last mile connections

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205 *See generally Traditional Transmission Media for Networking and Telecommunications*, INFORMIT (Aug. 26, 2014), http://bit.ly/1whpPwX.

206 An extreme example of this principle in action is AT&T's Fiber-To-The-Node (FTTN). At the node, equipment installed by AT&T converts the data travelling over the fiber optic cable into a format that can be transmitted over the original copper telephone lines which are already installed in the neighborhood or apartment building. AT&T provides a modem and set-top box for the customer to receive Internet and television services. While critics correctly point out that the entire network is not fiber optic as originally promised, this strategy is nonetheless commercially viable because it avoids the costly installation of new premises wiring as well as the low data speeds of longer copper runs. A pure fiber optic network would have been faster, but would have required installation of all new wiring at great expense. With U-Verse, AT&T provided much of the speed of faster services by partially upgrading the external plant and then running higher data throughputs over preexisting telephone lines. *See* Bruce Kushnick, *AT&T U-Verse is a Copper-Based PSTN Service: Lawmakers and the Media Were Duped*, HUFFINGTON POST (Jan. 23, 2013), http://huff.to/1wZtbqd.

207 *See* 47 U.S.C. § 214(a) (2012); 47 C.F.R. § 63.61(b) (2013).

208 *See generally* 47 U.S.C. § 153(10).

209 *See Evolution of Cable Television, supra* note 159; *When Your Telephone Company Discontinues Service,* FCC*,* http://fcc.us/1uZCkJ9 (last visited Aug. 25, 2014).

210 47 C.F.R. § 59.1.

211 *See Evolution of Cable Television, supra* note 159.

unnecessary.[212] These actions should be as transparent as possible, with well-defined metrics of competition at both local and national levels driving determinations. The metrics of competition should also follow antitrust principles, seeking to protect competition in the marketplace rather than competitors themselves.[213]

Procedurally, regulatory forbearance should also be applied as the default FCC action, with evidence of market failure being required to justify harsher regulatory treatment. This is critical to regulate an industry such as communications, where rapid shifts in technology can often outpace the abilities of regulatory agencies. This approach is also needed to prevent onerous or duplicative regulations from being imposed, or regulations from being imposed without evidence of market harm.

B. Rules Must Be Technology Agnostic, With A Focus On Bandwidth

In addition to treating all providers equally, the rules must also treat all technologies equally.[214] This seems a paradoxical[215] approach to the transition to an all-IP network, but it is critical to ensuring that private investment flows to where it is needed most, and stays out of those areas where it is not required.

For example, in many areas, the cost of maintaining TDM networks coupled with the performance advantages found in upgrading to IP networks will quickly usher in new investment.[216] But, as some comments have pointed out, other areas may remain on TDM networks for longer periods of time, or may even remain on TDM networks for the foreseeable future.[217] Still further locations might see TDM networks retired and never replaced with a wired alternative, instead relying on new wireless technologies.

A failure to upgrade is not necessarily a "bad thing." TDM networks can still provide valuable IP services that customers demand. In remote regions, a

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[212] *See* 47 U.S.C. §160(a) (providing that the FCC can forbear from enforcing regulations on common carriers under certain circumstances).

[213] *See* Spectrum Sports, Inc. v. McQuillan, 506 U.S. 447, 458 (1993) (noting the well-established purpose of antitrust law is to protect the functioning of competitive markets, rather than ensure the survival of market actors).

[214] *See* Jacob Kasternakes, *FCC proposal would destroy net neutrality,* THE VERGE (Apr. 23, 2014), http://bit.ly/1npsTTm.

[215] The reason we are here, after all, is because for many purposes, TDM networks are no longer in demand by the majority of consumers, even though regulations require that the services be maintained.

[216] *See Comments of Verizon and Verizon Wireless*, *supra* note 94 at 2 (Mar. 5, 2014) (accessible via FCC Electronic Comment Filing System) (outlining the business case for upgrading a particular area to a fiber network instead of existing copper).

[217] *See Comments of Telepacific Corporation, supra* note 24 (noting that in many areas Ethernet over copper remains a viable choice for a variety of reasons).

DS1 connection to a cellular site is sufficient to enable voice calls and limited data usage, or might connect a remote field office with a few employees to a central network.[218] Those operating in remote areas can continue to rely on networks already constructed, and this result might be more economically efficient than constructing a new network.[219] Similarly, permitting remote areas to be served by wireless technologies alone is not a regulatory failing given the rapidly advancing capabilities that wireless technologies can offer.

It is important to also recognize that different networks are in different states of repair and capability, and that not all TDM networks are equal. Service providers that decide to upgrade from TDM to IP networks are usually doing so because their TDM assets are at the end of their useful lives.[220] In those instances, the provider, who is facing the high costs of maintaining a TDM networks, typically decides to upgrade. However, other service providers with recently constructed or upgraded TDM networks might not be well served by a shift to IP networks. Even with demand for IP services, networking equipment to adapt existing TDM networks to newer IP is available and will continue to be viable in the near future.

Some critics of this approach point out that it ignores an important part of the FCC's mission: universal service.[221] They argue that allowing some areas to continue using outdated networks jeopardizes the needs of those living in rural and hard-to-serve areas.[222]

However, this view is misguided because it retains the mindset rejected by policymakers following the breakup of the old AT&T monopoly. Under the AT&T monopoly, it was the duty of the provider to serve all areas, regardless of cost, in exchange for the government sanctioned monopoly.[223] Today, Con-

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218 *See* Kurt Marko, *Remote Offices: Is A T1 Overkill?*, PROCESSOR (May 30, 2008), http://bit.ly/1zwi2ef (noting that although outdated, in many regions T1/DS1 lines are the only available option).

219 *Id.*

220 *See* Tim Greene, *VoIP vs. TDM Voice*, NETWORK WORLD (Oct. 26, 2007), http://bit.ly/1z3O6sf .

221 *See* LENNARD G. KRUGER & ANGELE A. GILROY, CONG. RESEARCH. SERV., RL30719, BROADBAND INTERNET ACCESS AND THE DIGITAL DIVIDE: FEDERAL ASSISTANCE PROGRAMS 14 (2013).

222 *See In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, Eighth Broadband and Progress Report, GN Docket No. 11-121, at 5 (Aug. 21, 2012) (noting that of the approximately 19 million Americans living in locations where fixed broadband is unavailable, 14.5 million live in rural areas).

223 *Universal Service*, FCC, http://fcc.us/1yWBGm7 (last visited Sept. 13, 2014).

gress has made the universal service mandate explicit,[224] levying a charge on each provider on a per-subscriber basis, and redistributing those monies to people and places needing support.[225]

Treating all technologies equally means that the market will be permitted to function where possible.[226] It also means that in areas where upgraded service is too expensive to be economically viable, the government will make a universal service policy decision and build out networks if need be. For example, it is a political and economic imperative that rural families be integrated economically and culturally into the larger fabric of the United States, and this has driven universal service funding towards schools and clinics in remote rural areas.[227] However, it also follows that companies that operate profit-generating remote facilities in need of communications services may be required to pay their own way, often at a more expensive price than required in denser areas.

Equal treatment of technologies also makes room for innovative new products and business models, many of which can enhance competition in unexpected ways. For example, in June 2013, Comcast unveiled its plans to broadcast a separate WiFi network from each of its subscribers' modems.[228] Intended to benefit all of its customers, the separate WiFi network is accessible to all Comcast customers with a simple login.[229] From Comcast's perspective, this is an opportunity to cover significant areas with WiFi, without the need to build a separate network or purchase spectrum for deployment.[230]

On one hand, this could be a signifiant driver of competition, enabling it to provide services that compete with fixed and mobile wireless broadband. However, this might instead cement Comcast's dominance of the broadband market, enabling it to shut out wireline and wireless competitors. Whatever the outcome, this highlights the need for the FCC to regulate services based on its effect on consumers, rather than the technology employed. Current regulations

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224 *See generally* 47 U.S.C. § 254 (2012).

225 In this way, it is no longer the assumed duty of a monopolistic firm to act as "carrier of last resort" through the implicit subsidies of monopoly rents. Instead, the explicit regulatory fees are used to fund government support of providing service in high cost areas. *See Universal Service*, FCC, http://fcc.us/1wFPyyX (last visited Feb. 16, 2014).

226 *After the Telecommunications Bubble,* ECD 2 (2003), *available at* http://bit.ly/1Acw5qL (arguing that regulatory policy should become more technology-neutral so that new technologies can provide the traditional services that consumers demand, thus providing competition with old networks).

227 *See Universal Service*, FCC, http://fcc.us/1yWBGm7 (last visited Apr. 13, 2014) (stating Universal Service supports schools and clinics in rural and underserved areas).

228 *Comcast Unveils Plans For Millions of Xfinity Wifi Hotspot*, COMCAST (June 10, 2013), http://bit.ly/1icYn7A.

229 *Id.*

230 *See* Julio Ojeda-Zapata, *Don't Panic, But That Public Wi-Fi is Coming From . . . Inside Your House,* TWINCITIES.COM (Feb. 1, 2014), http://bit.ly/1r086sX.

do not permit significant regulation of Comcast's WiFi by the FCC, because the technology relies on an information service to provide data, and on unlicensed wireless spectrum to reach consumers.[231] For the FCC to have the authority it needs to regulate if required, the FCC will have to rewrite its rules based not on the technologies employed, but instead on the relationship between the service provider and the customer.

The final rules that should be considered are those measuring market power. Depending on the level of market competition, the FCC may want to interfere by applying common carrier principles, or it may want to forbear from applying a variety of regulations. The next section details this issue.

C. Rules Must Be Geographically Accurate in Measuring Market Power

The most difficult and critical aspect of regulating communications services across the nation is deciding whether there is adequate competition to allow the market to function, or whether an entity has sufficient market power as to warrant regulatory scrutiny. Communications networks are unique because even if a provider does not possess market power on a national scale, it often possesses significant market power on a local scale.[232] If a firm is found to have market power, it might follow that it should have significant obligations to provide service at regulated rates.[233] On the other hand, the presence of one or more facilities-based competitors might be sufficient to convince regulators that no rate regulation is necessary.[234]

A significant hurdle to measuring the level of competition is determining which areas should be measured.[235] Many past measurements have been criticized for "showing" competition within a measured region, when only the central urban core of that region has multiple service providers.[236] Others argue that if a more urbanized center is competitive, the entire region should be considered competitive, because the majority of residents and businesses are in the

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231 *See* Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 967-68 (2005).

232 *See* David L. Cohen, *Comcast and Time Warner Cable Announce Merger, Detail Public Interest Benefits and Undertakings*, COMCAST (Feb. 13, 2014), http://bit.ly/1g19lxJ (stating that in the proposed merger between Comcast and Time Warner Cable, Comcast has agreed to spin off 3 million subscribers so that its cable television market share remains under 30%. While Comcast may have only a 30% national market share, in the areas where it provides service it is often one of two providers of wired broadband).

233 *See generally* 47 U.S.C. § 254 (2012).

234 *See Special Access Price Cap AT&T Petition Order*, 27 FCC Rcd 10557, para. 3.

235 *See id.*

236 *See id.*

center.[237]

The answer will not be an easy one, but it can be helped along by a few factors. The FCC has significant experience measuring broadband throughput across the nation using its speed testing application.[238] While not determinative in itself, this provides a starting point to evaluating the data submitted by services providers. There will also be significant industry incentive to participate, as the determinations can have an impact on the rates that can be levied. Users of services will also have significant incentives to contribute data, especially in areas where there is little competition and prices are above market norms, or services are particularly poor.

VI. CONCLUSION

While many have argued that reclassification is unnecessary in today's competitive landscape,[239] the reality is that if current trends continue, reclassification is the only option to preserve market competition and ensure a smooth transition to an IP network across the United States. Reclassification with equal treatment of providers, equal treatment of technologies, and meaningful measurements of market power is the only sensible path to ensure that competition is allowed to flourish across both rural and urban areas. It also ensures an economically sensible outcome, promoting investments where the market supports it, and allowing government universal service intervention where necessary.

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237 *See id.*

238 *See* Mike Byrne & Eric Spry, *FCC Speed Test App: Our First Results*, FCC (Nov. 21, 2013), http://fcc.us/13cg4nL.

239 *See Comments of Verizon and Verizon Wireless*, *supra* note 94 at 5-6 (Mar. 5, 2013) (accessible via FCC Electronic Comment Filing System) (arguing that competitors that did not bear the risk of constructing new fully IP networks should not be entitled to use those networks constructed by others).